FORESTRY SUGGESTIONS

OHIO
Agricultural Experiment Station

WOOSTER, OHIO, U. S. A., JANUARY, 1908

BULLETIN 189

The passing of the forest

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BULLETIN

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FORESTRY SUGGESTIONS.

BY W. J. GREEN AND EDMUND SECREST.

Will it pay to improve and maintain a woodlot for forestry purposes?

This is a relevant question but the answer given for one case may not serve for another, and yet one needs to know before beginning operations whether he is likely to make a good or bad investment.

A woodlot which is simply a woodland pasture, where there are no young trees growing, where the grass has gained a strong foothold and the large trees are simply culls, left because they are not worth cutting for lumber or firewood, has little promise of profit in it for forest operations. A cleared field, even though the soil is much worn by cropping, offers greater advantages for forestry.

In order to make it worth while to improve a woodlot and hold it for the growth of timber, there should be some growing trees in it. The large trees cannot be counted as of any value unless they may serve as seed producers or do not show signs of decay.

The young trees may be of any size, but the smaller they are the easier it is to do planting between them. If the stand of young trees is sufficient to cover the ground well, so as to kill the grass, it will, no doubt, pay to do considerable work to improve the conditions. If there is half a stand of good species it will, in most cases, pay to plant more trees, and even though there is not more than one-fourth of a stand, all being the best species, it may pay to exclude livestock and make the needed improvements. Much depends upon the kind of trees growing in the woodlot and their condition as well as upon the success in planting young trees to fill vacancies.

Without doubt there are more woodlots that are beyond all possibility of profitable reconstruction than there are those which may be successfully improved.

While more thorough investigations are needed in order to make positive statements possible, it may be said that a well-stocked young forest is a profitable investment on land of average value. Land which is well stocked with thrifty growing trees, with good species predominating will yield better returns than if in pasture. This is especially true of hilly land where the soil is not of the best quality, and is liable to wash.

The cases where a question can be raised regarding profits in woodlot improvement are those where the stand is poor or the species inferior.

The Experiment Station is making a study of woodlot improvement and is ready to co-operate with land owners in such work, by way of offering suggestions, and in some instances by furnishing trees. Work of this kind is both experimental and demonstrational and is undertaken by the Station in order to learn the best methods of procedure.

There is much, however, which is already well known and has been fully proved by experience in this and other countries. There are fundamental principles of forestry that are applicable every where, but as to the methods which are to be followed in particular cases we have much to learn.

We need also to know more concerning the rate of growth of the various species, the best mixtures of forest trees, the most suitable distances of planting and the adaptation of different kinds to the various soils of the state. These matters can be studied without hindrance to the work as we proceed along well established lines.

One must settle definitely before beginning forestry operations of any kind that the trees shall be given a fair chance. No livestock must be allowed to browse the tender foliage and nip off the tops of the trees, nor to break them down or strip off the bark. The soil about the roots must not be puddled by trampling hoofs, nor must the leaf mulch be broken up and ground into powder by restless animals. Grass must be destroyed by shade and to this end the leaf canopy above must be preserved. In short, forest conditions are essential to success in forestry and the utmost care must be taken to preserve them.

Nature always establishes these conditions as soon as possible and to assist in this work should be the aim of those who wish to succeed in forestry. The way to bring this about is very simple, even though the same method may not be followed in all cases.

Fill all open spaces with trees of some kind and put in enough so that when they are well started the foliage will completely shade the ground. To follow this rule too strictly with the catalpa would not give the best results, as when planted closely enough to kill the

grass this tree fails to make satisfactory growth. It will, however, hold its own fairly well against grass after once started, and other trees of slower growth may be planted with it.

The method of planting the open spaces of a woodlot must vary according to circumstances. In Figure I is shown a common type of an open hickory grove, where the trees stand so far apart that they would form bushy tops and never make any quantity of useful timber.

These trees are worth saving, besides are difficult to grub out, but in order to force them into an upright growth, with trunks free of limbs, the spaces between have been filled with catalpa, locust and other species.

FIG. I. A hickory grove where the ground has been plowed and young trees successfully started in the open spaces.

There are so few hickory trees that it was possible to plow most of the ground and to cultivate the newly-planted trees. The trees which were planted are of more rapid growth than the hickories and will soon overtop them but the hickories will then be compelled to reach upward to get light, and being well established are not likely to be smothered by the other trees.

Figure II shows a hickory grove where the trees are more numerous than in Figure I. No plowing could be done in this case but the trees were planted by the use of mattock and spade. Catalpa trees were used in planting but locust in part, or wholly, might have been better. Ash, tulip poplar, silver maple, elm, black walnut, or in fact, almost any species could be used, as the hickory trees are thin on the ground and not large enough to cast much shade. Carolina poplar might be used sparingly in such a case, but it would not be well to cover the tops of the hickory trees too quickly with shade.

FIG. II. An open hickory grove where inter-planting of faster growing species has been made.

FIG. III. Pastured woodlot where the leaf mulch has been swept away by the wind.

FIG. IV. Part of woodlot shown in Fig. III. The leaves find resting places where they are not needed.

FIG, V. A beautiful beech grove. Trees are too far apart to make good timber and yet the shade is too dense to permit reproduction.

In some cases a furrow might be plowed where the planting is to be done. Where blackberry brushes abound they will need to be cut before planting, and one or two seasons thereafter, or until the trees get well started. Eventually they will do more good than harm by holding the leaf mulch. It is a matter of common observation that there is more leaf mold and the soil seems richer in a blackberry patch than elsewhere. Cutting of blackberry plants should be done in the spring only.

FIG. VI. Open beech grove of no value but where shade and browsing animals have prevented reproduction.

The trees in a large majority of woodlots should be removed and a new start made. In many cases they have reached maturity and are on the decline. This is particularly true of many woodlots where white oak preponderates. Many of these trees have reached their maximum in height and diameter growth, and while apparently sound, will upon examination prove to be defective in a greater or less degree. Individuals of this and other species may from all appearance be healthy and thrifty, yet when felled will be found unfit for the mill. Reproduction is usually entirely absent in such woodlots, or if any exists, is of an inferior quality, and amounts to nothing.

FIG. VII. Good reproduction in spots. Beech trees cut in order to permit interplanting.

FIG. VIII. Young growth will start where there are seed trees if it has a chance.

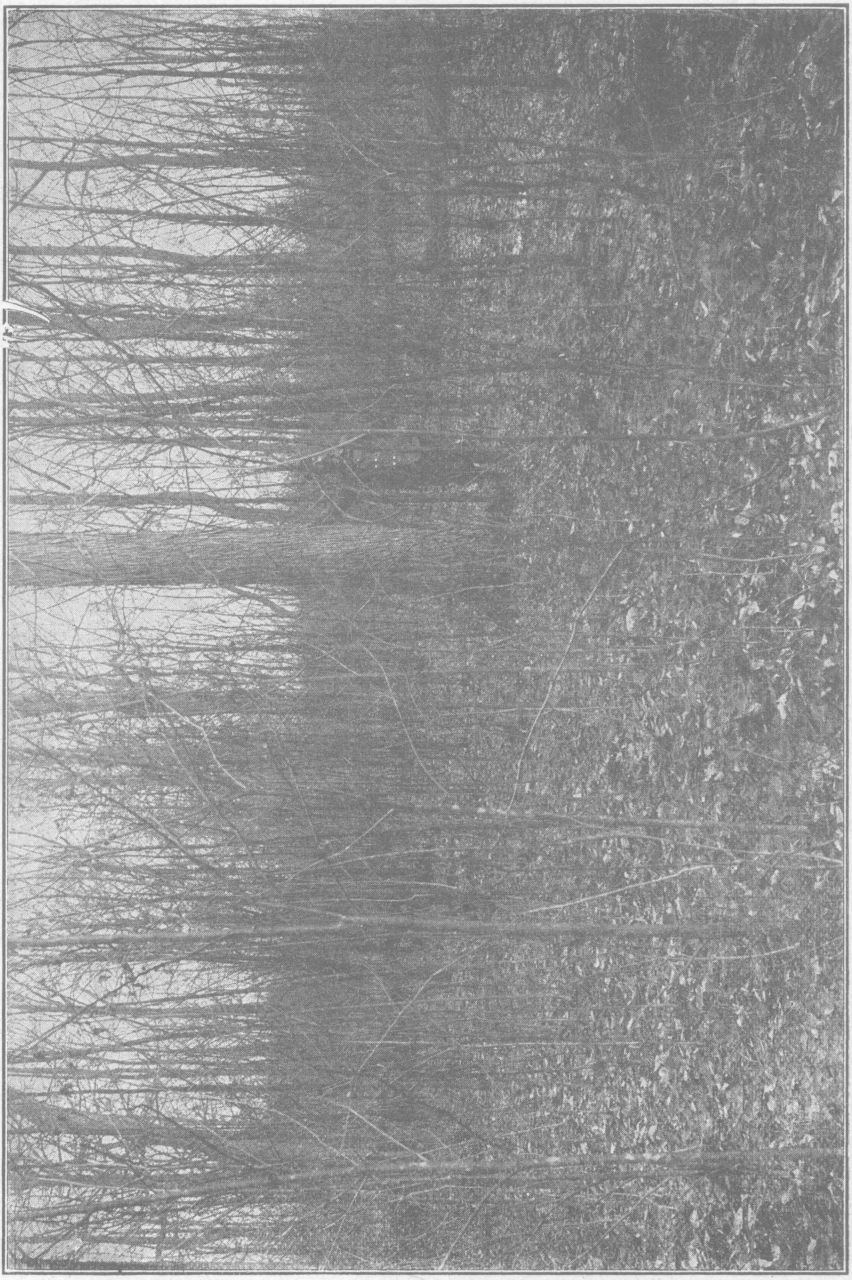

FIG. IX. The high headed hickory does not prevent reproduction.

FIG. X Underbrush holds the leaf mulch.

There is also an absence of undergrowth, so essential to good forest conditions. This permits of the leaves being blown away, and piled in locations where they are not needed, as shown in Figs. III and IV. Thus the ground is deprived of all protection, the soil moisture is dissipated, grass comes in, all means for securing natural reproduction are destroyed, and the trees themselves, though not matured, decrease in rate of growth, become unhealthy and finally die.

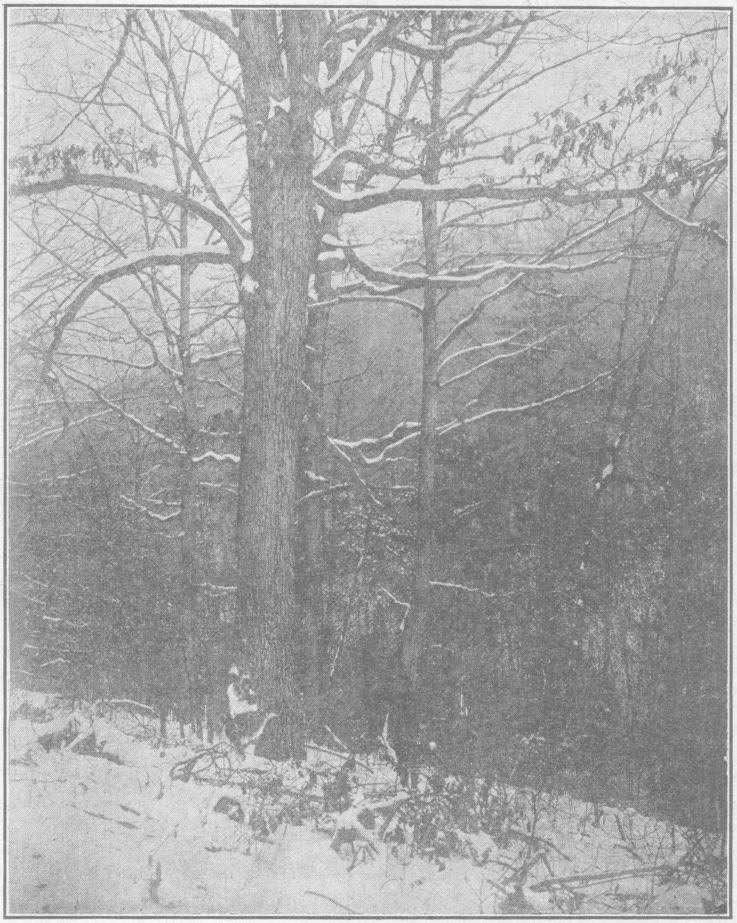

FIG. XI. A lone monarch.

In reforesting these areas it is best to plant the season following the removal of the matured trees. The ground should be plowed as far as the stumps and roots will permit, so as to break up the sod and exterminate the grass and worthless undergrowth. The species to be planted in such locations will vary, and must be determined largely by local conditions of soil, site, etc. It is usually a safe plan to plant species naturally adapted to the situation. Faster growing and exotic ones may be used, if known to thrive on such soil.

FIG. XII. A dense stand from which "weed trees" should be removed in thinning.

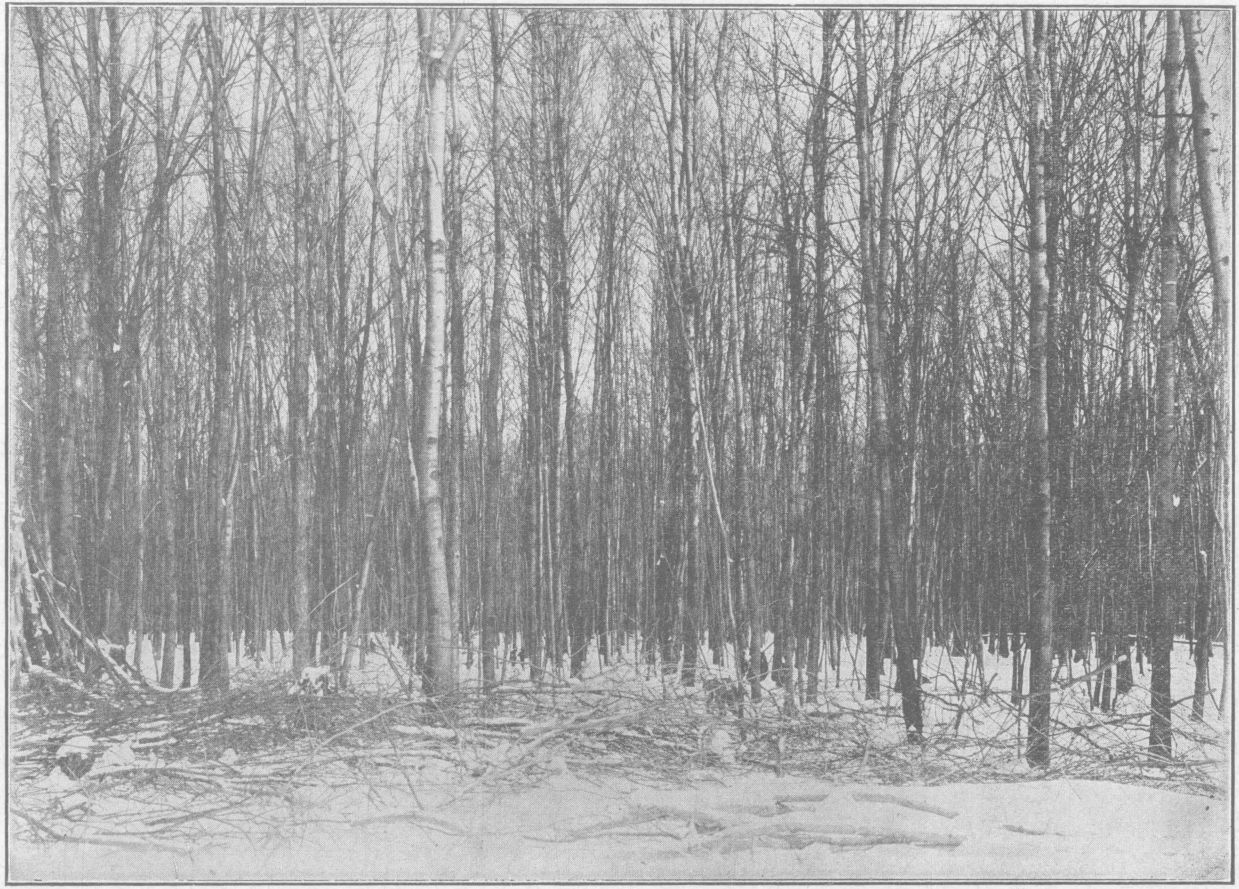

FIG. XIII. A dense stand from which some of the valuable species must be removed in thinning.

White oak clay will produce white ash, catalpa, maple, and in many cases, white maple and black walnut.

It is always well to plant several species and especially those which grow naturally in mixture on the land. In this case the trees which grow fastest, or can be utilized when of small size, may be removed and marketed when thinning becomes necessary.

FIG. XIV. Where it is at home the chestnut is a profitable tree.

The beech woodlot (Figs. V and VI) is another common type. Beech produces an inferior grade of lumber, and, on account of its slow growth and spreading habit, is not as profitable as are other species.

Figure VI illustrates the condition of a majority of beech woodlots. The well developed crown of the species and its heavy foliage make it impossible for reproduction to take place in its shade, hence the ground is often bare, even to the exclusion of grass. Such trees should be removed from the woodlot, even though they cannot be utilized. If sufficiently sound, the timber may be used for framing material and interior work, where it is not exposed to the weather. In some localities beech can be used as fire wood if for nothing else.

FIG. XV. Pole trees ready for the harvest.

A beech stand, as represented in Fig. V, is also impracticable to leave standing. The trees are too far apart to clear themselves of branches. and at the same time will not permit of any interplant-

ing on account of their size and shading propensities. Such groves are beautiful but not profitable. In such cases, therefore, the most profitable operation is to cut the trees and start anew by artificial means.

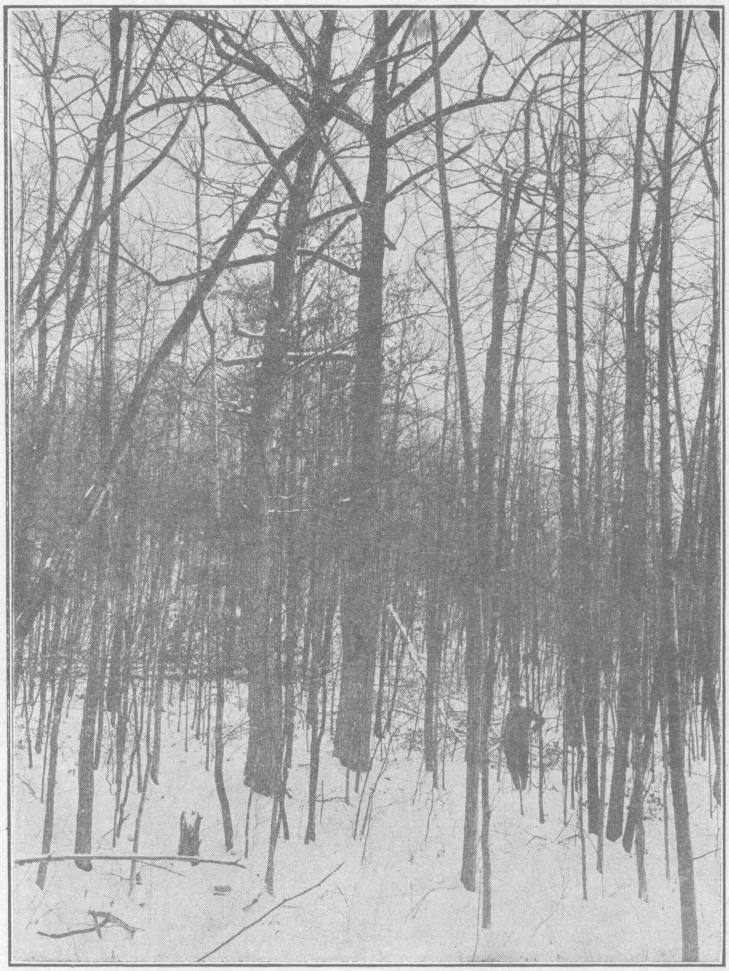

FIG. XVI. Chestnut trees past usefulness.

A beech woods of the type above mentioned affords a most excellent soil mulch, due to the dense foliage of the trees, and the slow decomposition of this leaf litter aids materially in improving the soil.

If planting is done the season following the removal of the trees, plowing is not necessary, it being a difficult operation in beech woods, owing to the network of roots in the surface soil. A mattock is the best tool to use in planting under such conditions. (This is true wherever the leaf litter has formed a mulch sufficient to keep out grass and weeds.)

Woodlots often contain a mixed growth in which certain portions are well stocked with young trees and others are not. This is frequently due to the presence of large trees of spreading habit, as beech, scarlet oak, chestnut or white oak. In any case such individuals act as "weed trees," and should be removed, whether they are of valuable species or not, and the spaces planted. Such operations are shown in Figure VII, where several large beech have been cut and the ground is ready for planting. The species to be planted in such places will depend upon conditions. If the space to be planted is large, the operation may be treated as a pure planting. If small, and in danger of being shaded, trees somewhat tolerant of shade should be used, as catalpa, ash, locust or white maple. In the large spaces on beech soil, red oak and catalpa might be planted in mixture. In such cases, the former should be planted first and allowed to become well started before the catalpa is planted, as the latter, being of faster growth, is liable to overtop and suppress the former.

FIG XVII. Without trees the landslide problem cannot be solved.

Figures VIII and IX represent fair types of unpastured woodlots. Figure VIII shows young white oak coming in the open spaces and among the trees. Here the leaf mulch has been conserved and the conditions for the germination of the acorns and growth of the

trees themselves have been excellent. The present stand of larger trees is not dense enough to produce clean boles, but this condition will soon be remedied by the oncoming growth.

Figure IX shows an ideal forest cover. The leaves are evenly distributed over the ground, and together with the reproduction and undergrowth create the most favorable conditions for growth. The young trees are straight, tall and clear boled.

FIG. XVIII. Gathering the fragments.

Culled trees of merchantable species often become the worst "weeds" in the forest. Figure XI shows a large, spreading white oak which is preventing the growth of young trees by its distorted habit of growth. In many cases such individuals are worthless for lumber and are not marketable for any other use; they may simply be girdled and allowed to stand. This practice must be resorted to, however, only when it is impracticable to cut them down because of the existence of some defect, or liability of injuring young growth.

Proper thinning in many second growth stands is a matter of prime importance, and yet one of which much remains to be learned by experimentation.

There are second growth woodlots in which trees are obviously interfering with the proper development of each other. Many times such stands consist of a mixture of merchantable and worthless trees. It is an unfortunate fact that frequently the latter class outgrow and suppress the former. This is exemplified in many woodlots containing the oaks in mixture. Figure XII shows a mixed stand of white, black and scarlet oak (the latter is often locally called "jack oak"), which is in need of thinning. Scarlet oak produces a very inferior grade of lumber, yet it grows almost one-third faster than white oak. The removal of all of the scarlet oak and some of the black oak will establish a more normal stand and give the white oak a chance for development.

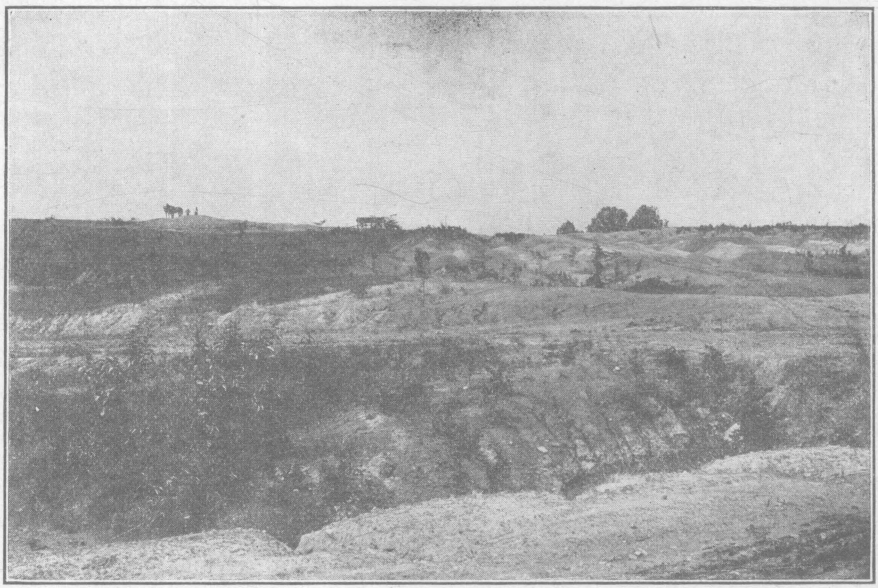

FIG. XIX. Trees are needed to save the soil.

Figure XIII represents a pure stand of white maple, ash, cherry, sugar maple, and red oak, containing no "weed trees." But it must be thinned in order to attain a more rapid development. When the crowns of two or three trees interfere, the best individual must be left to stand and the others removed. The woodsman will have to be governed largely by his judgment in determining what trees shall be removed. A good rule is to thin often and a little at a time. The leaf canopy should be broken as little as possible.

Too severe thinning will leave the soil exposed to the drying action of the wind and the trees will make a slower instead of a faster growth. Lateral branches will start from hitherto undeveloped buds on the bole of the tree and sap the strength of the tree, often causing it to become top dry. Weeds and grass spring up in great profusion, seriously hindering the germination and development of young seedlings.

FIG. XX. Tulip poplar seedlings.

The products of thinnings can usually be utilized in some manner. In many instances they will serve as mine props and fire wood and in some cases as railroad ties. Thinning may be accomplished by girdling. This means may prove practical when there is no demand for the thinning products. It is often more expedient than cutting the trees but is unsatisfactory in some ways, as the dead trees form an excellent breeding place for ravaging insects, and often good material for fires.

The manner of the utilization of forest products is often an important matter. Many are misused. Chestnut trees capable of producing poles are cut into ties, with a large amount of waste, and reduced profits.

Figures XIV and XV show stands of chestnut of a pole size ready for the harvest. Trees not capable of producing poles should be worked into ties or posts.

Large chestnut trees, as those represented in Figure XVI, are usually doty or hollow, and always produce a "brashy" and inferior grade of saw timber.

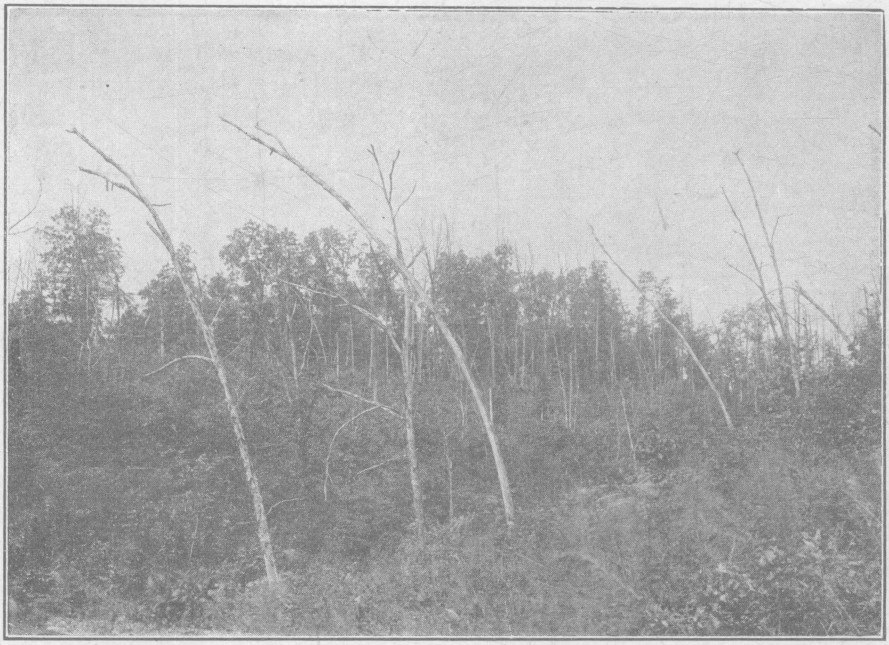

FIG. XXI. After the fire.

The same is often true of other species. White oak is often worked into tie timber and piling, at a time when it is capable of making its best growth. Many trees from twenty to thirty inches in diameter, and of good height, which would have produced the highest grade of lumber, are sold at the nominal price of white oak tie stumpage. Many farmers have not adjusted themselves to the new economic conditions, and the result has been that they have let the timber go at too low a price, but in any case it is better to give first consideration to the young trees and to dispose of the decaying mature trees while they are yet in a marketable condition and before the loss through keeping them becomes total.